The cell employed was the type 19 C of the Julien Company, weighing complete about 44 pounds, which is rated by that company as having a capacity of 200 ampère-hours, and the rate of discharge given is 30 ampères. It will be seen, however, that, as these lamps take about $\frac{9}{10}$ of an ampère each, the batteries were being discharged at about twice their normal rate, and, where occasion required, the engine was stopped and the batteries supplied current for the entire plant, thus discharging at almost three times their nominal rate.

This is a particularly creditable showing for these batteries. The principal difficulty heretofore in the use of accumulators has been that they have not been permitted to be discharged at a greater rate than from about one-tenth to one-eighth of their capacity, whereas in this exhibit they were regularly required to deliver their full capacity in about four hours.

The cells were in use from the commencement of the exhibition, the 1st of October, until Dec. 15, and did not in that time require the least attention on the part of the company, the plant being run entirely by a man in charge of the gas-engines, who, until the opening of the fair, had never been in charge of an accumulator plant.

The lights were burned four hours each night, which, discharging at the rate of about 60 ampères, and occasionally at 80 to 85, made a total of 250 ampère hours taken out, while the rated capacity (discharging at the nominal rate) is but 200 ampère hours. This is an indication of the large amount of reserve energy there is always on hand in case of an accident or stoppage of the generating-plant, or in case of an emergency.

A BLIZZARD MEETS AN ELECTRIC ROAD.

RECENTLY one of the severest tests to which an electric railroad can be subjected was experienced by the Davenport Electric Line, installed by the Sprague Electric Railway and Motor Company of New York, at Davenport, Io., and one which proves most conclusively that an electric railway can be operated even under the most adverse conditions of weather. The blizzard, which had been howling about the Dakota prairies during the first part of the week, and getting up its strength by snowing in the territory farmers, decided to come south, and on Jan. 9 struck the city of Davenport.

The snow, which was of the heavy damp variety, fell all day, and covered the streets to the depth of from four or five inches to one foot on a level, and in several places caused deep drifts over the line of the electric railway. In spite of this, the cars on the electric line kept running uninterruptedly, carrying a large number of passengers, and proving conclusively that no amount of snow could prevent the cars from running on schedule time. The president of the road, Mr. W. L. Allen, was greatly pleased with the signal triumph of the Sprague people, who had told him in the autumn that snow could not interfere with the operation of the road, and is enthusiastic over electric railways.

This road has been in operation about four months, and has been giving very great satisfaction to the management and citizens of Davenport, who have had a much better service since its installation than they ever had while the road was being operated by horses. The cars move faster, are under quicker and more perfect control, and are much more easily managed than the cars drawn by animal power. The regular Sprague overhead system, with small No. 6 silicon-bronze wire as a working conductor, is in use upon this road. All the latest devices and improvements adopted by the Sprague Company for facilitating the operation and increasing the convenience of their electric roads are in use here.

Among the principal points of excellence of the Sprague system of electric railway, may be mentioned the system of conducting current to the cars by means of a working conductor, separate from the main conductor, but connected to it at intervals by automatic cut-outs, by which an accident on any portion of the line does not interfere with the remainder of the road; the use of flexible suspension for the motors, preventing accident from sudden strain; and the method of controlling the motors from either platform without the use of idle resistance.

TESTING A PNEUMATIC DYNAMITE GUN.

ON Saturday last a test was made of the capabilities of a pneumatic gun of fifteen inches bore, forty feet in length, intended to throw a shell containing 700 pounds of dynamite and nitro-gelatine. Two shots were fired, when, owing to the leakage of an air-valve, the experiments were postponed to some future time. As far as the trial went, the results were satisfactory. A mile from the gun, which was located at Fort Lafayette, in the Narrows, New York Bay, a rectangular space 50 by 100 feet was marked off in the waters of Gravesend Bay by four buoys. The first projectile from the gun passed about 250 yards beyond the target, though it was an excellent line shot. Its course was easily followed by the unaided eye from the moment it left the gun until it entered the water. It passed through the air as though shot from a rifled gun, without an oscillation or a "wabble." It exploded a moment after striking the surface, throwing up the water, like an immense fountain, from 100 to 200 feet into the air. This first projectile contained 170 pounds of dynamite.

The second projectile, containing 200 pounds of dynamite and 300 pounds of nitro-gelatine, a larger charge than had ever been used before, fell short of the mark, but the effects of its explosion were tremendous. A reversed Niagara, of water, mud, and stones, shot perhaps 200 feet into the air. It seemed as though a water-volcano had broken forth in Gravesend Bay.

The reason for this shell not reaching the target appeared to be that there was some defect in the tail-piece, which is depended upon to keep it from oscillating or wabbling in its flight. Some part of this tail-piece was evidently injured in leaving the gun, and the consequence was that the longitudinal axis of the projectile (which was six or seven feet in length) deviated from the line of flight. It swung through an angle of about forty degrees, back and forth, while describing the arc of flight, the oscillation decreasing as the projectile approached the water.

Further tests of the gun are promised in the near future, and they will be watched with interest, as the dynamite gun is destined to take an important place in the warfare of the future.

THE RISLEY AND LAKE COMPOSING-MACHINE.

THERE is now on exhibition at No. 22 Spruce Street, this city, a machine intended to dispense with the use of type in certain kinds of printing. It is the invention of Messrs. Risley and Lake; and though only an experimental machine, and therefore somewhat imperfect in many of its details, it does its work speedily and well. The printing done by it is not as perfect or as pleasing to the eye as ordinary letterpress work, but is good enough to satisfy the requirements of that important branch of the printer's art known as law printing, in which small editions of lawyers' briefs, legal arguments, evidence, etc., are desired in a few hours' time.

This machine, in its present crude but very promising stage of development, is shown in the accompanying illustration. As a satisfactory description of it cannot be given unless the machine be seen in operation, only a few of its features will be touched upon here. Though not so complicated as the engraving makes it appear, still many of the mechanical movements involved are so novel that they must be seen before they can be readily understood.

It will be perceived that there is a key-board like that of an ordinary type-writer, the use of which is obvious. There is a key for each character used. These characters are all cast or cut on one cylindrical shell or sleeve, in which feature the machine resembles the well-known Crandall type-writer. This type-shell may be seen, in the illustration, at the centre of the machine, immediately to the rear of the key-board, and in front of the sheet of paper upon which the printing is to be done. One peculiar feature of this machine is, that the printing does not begin until the keys for about fifty characters have been struck, so that the operator is always at least a line ahead of the impressions as they appear on the paper. The keys, instead of acting directly upon the printing apparatus, act upon a set of pins, which are carried in a revolving disk; each key, when depressed, setting its appropriate pin in position for actuating the printing mechanism when the disk shall have carried it around to the proper point. In this way there are always stored